IN THE CLAIMS

Current Listing Of Claims:

1. (Currently Amended) An apparatus for wet processing the device side of individual wafers, comprising:

an acoustic energy generator including:

a platter having a frontside and a backside, and

one or more acoustic wave transducers mounted on the platter backside;

a wafer bracket for positioning a wafer having a device side and a non-device side over the acoustic energy generator~~, wherein the device side of the wafer is distal to the acoustic energy generator and the non-device side of the wafer is proximate to the acoustic energy generator~~;

a device for rotating the wafer bracket relative to the platter;

a first liquid dispenser for flowing a first liquid between said acoustic energy generator and said wafer; and

~~wherein the first liquid is in contact with both the acoustic energy generator and the wafer, and transfers acoustic energy from the acoustic energy generator to the non-device side of the wafer;~~

a second liquid dispenser for flowing a processing liquid from the second liquid dispenser and onto said device side of the wafer~~; and~~

~~wherein the acoustic energy irradiating the non-device side of the wafer is transferred to the device side of the wafer having a frequency and intensity at the device side of the wafer to improve the cleaning performance of the processing liquid on the device side of the wafer, while also minimizing an associated risk of damage to devices on the wafer due to the acoustic energy acting on the device side of the wafer~~.

2. (Currently Amended) The apparatus for wet processing individual wafers of claim 1, wherein the acoustic energy generator is configured to transmit acoustic energy perpendicular to the ~~strikes the~~ wafer non-device side ~~perpendicular~~.

3. (Currently Amended) The apparatus for wet processing individual wafers of claim 1, wherein the ~~acoustic energy generator further comprises:~~

one or more acoustic wave transducers are ~~mounted on the acoustic generator and~~ positioned to be parallel to and facing the non-device side of the wafer.

4. (Canceled)

5. (Canceled)

6. (Canceled)

7. (Original) The apparatus for wet processing individual wafers of claim 1, further comprising:

a device for linearly transporting the wafer.

8. (Previously Presented) The apparatus for wet processing individual wafers of claim 1, wherein the second liquid dispenser is a nozzle positioned to direct a liquid flow onto the device side of the wafer.

9. (Previously Presented) The apparatus for wet processing individual wafers of claim 3, wherein the one or more acoustic wave transducers comprise a piezoelectric material.

10. (Currently Amended) The apparatus for wet processing individual wafers of claim 1 [[6]], wherein the platter frontside is positioned parallel to and ~~the wafer surface, with the platter front side~~ facing the wafer non-device side.

11. (Original) The apparatus for wet processing individual wafers of claim 10, wherein the platter diameter is at least 95% the diameter of the wafer.

12. (Original) The apparatus for wet processing individual wafers of claim 11, wherein the one or more acoustic wave transducers are mounted on the platter backside to cover 50-100% of the platter backside area.

13. (Original) The apparatus for wet processing individual wafers of claim 3, wherein the one or more acoustic wave transducers cover the radius of a wafer.

14. (Currently Amended) The apparatus for wet processing individual wafers of claim 1 [[6]], wherein the one or more acoustic wave transducers cover the diameter of a wafer.

15. (Currently Amended) The apparatus for wet processing individual wafers of claim 1 [[6]], wherein the one or more acoustic wave transducers provide acoustic energy to cover 50-100% of the non-device side of the wafer.

16. (Currently Amended) The apparatus for wet processing individual wafers of claim 1, wherein the ~~acoustic energy generator comprises~~ one or more acoustic wave transducers have ~~having~~ a selected transparent resonance frequency of 5.4 MHz ± 30% for 300 mm wafers, which minimizes sonic wave reflections in the wafer, wherein the transparent frequency is a selected frequency of acoustic energy in which the wafer is transparent to the acoustic energy having the selected frequency.

17. (Canceled)

18. (Currently Amended) The apparatus for wet processing individual wafers of claim 1, wherein the ~~acoustic energy generator comprises~~ one or more acoustic wave transducers have ~~having~~ a resonance frequency less than 1.5 MHz.

19. (Currently Amended) The apparatus for wet processing individual wafers of claim 1, wherein the acoustic energy generator is configured to pulse acoustic energy ~~generated acoustic energy is pulsed~~.

20-21. (Canceled)

22. (Currently Amended) The apparatus for wet processing individual wafers of claim 1 [[5]], further comprising a through hole in the platter for flowing a liquid.

23. (Original) The apparatus for wet processing individual wafers of claim 22, further comprising a fluid feed tube attached to the through hole at the platter backside.

24. (Currently Amended) The apparatus for wet processing individual wafers of claim 1 [[5]], wherein a coating is applied to the platter frontside.

25. (Original) The apparatus for wet processing individual wafers of claim 24, wherein the coating is a fluoropolymer.

26-44. (Canceled)

45. (Currently Amended) An apparatus for wet processing the device side of individual wafers comprising:

an acoustic energy generator including:

a platter having a frontside and a backside, and

a plurality of megasonic piezoelectric transducers attached to the backside of the platter;

a wafer bracket for positioning a wafer having a device side and a non-device side over the acoustic energy generator;

a wafer bracket for positioning the wafer over said platter such that said non-device side of the wafer is positioned substantially parallel to and over the platter frontside so that a gap is formed between the wafer non-device side and the platter frontside, wherein the wafer bracket is rotatable relative to the platter;

a liquid feed port for flowing a liquid in the gap between the wafer non-device side and the platter frontside; and

a nozzle for directing a processing liquid flow from the nozzle and onto the device side of the wafer to be processed. ~~The apparatus of claim 1, wherein the acoustic energy generator further comprises:~~

~~a platter having a frontside and a backside, comprising: a plurality of megasonic piezoelectric transducers attached to the backside of the platter; and wherein~~

~~the wafer bracket to position a wafer having a device side and a non-device side over said acoustic energy generator, further positions the wafer over said platter such that said non-device side of the wafer is positioned substantially parallel to and over the platter front side so that a gap is formed between said wafer non-device side and said platter frontside; and wherein said first liquid dispenser comprises:~~

~~a liquid feed port for flowing a liquid in said gap between said wafer non-device side and said platter frontside;~~

~~wherein said liquid fills said gap contacting both the frontside of the platter and the non-device side of the wafer; and wherein the second liquid dispenser comprises:~~

~~a nozzle for directing a processing liquid flow from the nozzle and onto said device side of the wafer to be processed, and~~

~~wherein said transducers apply megasonic energy to said platter, which transfers the megasonic energy to said liquid in said gap, which transfers to said non-device side of the wafer, which transfers to the device side of the wafer, and then, transfers the megasonic energy to the processing fluid on the device side of the wafer.~~

46. (Currently Amended) The apparatus ~~for wet processing individual wafers~~ of claim 45, ~~wherein the wafer bracket is rotatable relative to the platter, and~~ wherein the plurality of megasonic piezoelectric transducers ~~transducer areas~~ provide between 90-100% coverage of the wafer non-device side.

47-51. (Canceled)

52. (Previously Presented) The apparatus of claim 45 wherein said wafer bracket is capable of rotation up to 6000 rpm relative to the platter.

53-220. (Canceled)

221. (Currently Amended) The apparatus for wet processing individual wafers of claim 1, wherein the ~~acoustic energy generator comprises a~~ plurality of acoustic wave transducers ~~having different resonance frequencies that~~ are capable of simultaneously transmitting ~~the~~ different resonance frequencies.

222. (Canceled)

223. (Previously Presented) The apparatus for wet processing individual wafers of claim 221, wherein the different resonance frequencies comprise about 900 KHz and about 1.8 MHz.

224. (Previously Presented) The apparatus for wet processing individual wafers of claim 1, wherein the acoustic energy generator comprises an acoustic wave transducer having a transparent resonance frequency which minimizes sonic wave reflections in the wafer, wherein the transparent frequency is a selected frequency of acoustic energy in which the wafer is transparent to the acoustic energy having the selected frequency.

225. (Currently Amended) The apparatus for wet processing individual wafers of claim 1, wherein the first liquid and the process liquid are different liquids ~~while they are in contact with the non-device side and device side of the wafer, respectively~~.

226. (Canceled)

227. (Currently Amended) The apparatus for wet processing individual wafers of claim 1, wherein the ~~acoustic energy generator comprises a~~ plurality of acoustic wave transducers ~~having~~ have different resonance frequencies, in which their intensities are separately controllable and the different frequencies are integer multiples a lowest frequency.

228. (Currently Amended) The apparatus for wet processing individual wafers of claim 45, ~~wherein the wafer bracket is rotatable relative to the platter, and~~ wherein the plurality of megasonic piezoelectric transducers cover greater than 80% of the platter backside area.

229. (Previously Presented) The apparatus for wet processing individual wafers of claim 45, wherein the platter further comprises a coating on the platter frontside.

230. (Previously Presented) The apparatus for wet processing individual wafers of claim 45, wherein the platter has a diameter greater than the wafer to be processed.

231. (Previously Presented) The apparatus for wet processing individual wafers of claim 45, wherein the wafer bracket positions the wafer substantially centered over the platter.

232. (Currently Amended) The apparatus for wet processing individual wafers of claim 45, wherein ~~the plurality of megasonic transducers comprise a plurality of piezoelectric transducers having different resonance frequencies, and~~ the plurality of megasonic piezoelectric transducers are capable of simultaneously transmitting the different resonance frequencies.

233. (Canceled)

234. (Currently Amended) The apparatus for wet processing individual wafers of claim 232 [[233]], wherein the different resonance frequencies comprise about 900 KHz and about 1.8 MHz.

235. (Currently Amended) The apparatus for wet processing individual wafers of claim 45, wherein the plurality of megasonic piezoelectric transducers comprises a piezoelectric transducer having a transparent resonance frequency which minimizes megasonic reflections in the wafer, wherein the transparent frequency is a selected frequency of acoustic energy in which the wafer is transparent to the acoustic energy having the selected frequency.

236. (Currently Amended) The apparatus for wet processing individual wafers of claim 45, wherein the said liquid and the said process liquid are different fluids~~, which are maintained separate from each other before and while in contact with the non-device side and device side of the wafer, respectively~~.

237. (Canceled)

238. (Currently Amended) The apparatus for wet processing individual wafers of claim 45, wherein the plurality of megasonic piezoelectric transducers comprise a plurality of piezoelectric transducers having different resonance frequencies, in which their intensities are separately controllable.

239. (Previously Presented) The apparatus for wet processing individual wafers of claim 45, wherein the platter further comprises an opening in said platter to flow a fluid in said gap between said wafer backside and said platter frontside.

240. (Previously Presented) The apparatus of claim 239 wherein said hole is positioned substantially in the center of said platter.

241. (Previously Presented) The apparatus of claim 239 wherein said hole is slightly offset from the center of said platter by a distance in the range of greater than zero and up to a few millimeters.

242. (New) An apparatus for wet processing a substrate comprising:

a platter having a frontside and a backside;

one or more acoustic wave transducers mounted on the platter backside;

a bracket for positioning a substrate over the platter, the bracket rotatable relative to the platter;

a first liquid dispenser for flowing a first liquid between the platter and the substrate; and

a second liquid dispenser above the platter for flowing a processing liquid from the second liquid dispenser and onto the substrate.

243. (New) The apparatus of claim 242 wherein the one or more acoustic wave transducers mounted on the platter backside cover 50 – 100% of the platter backside area.

244. (New) The apparatus of claim 242 wherein the plurality of acoustic wave transducers are capable of simultaneously transmitting different resonant frequencies.

245. (New) The apparatus of claim 244 wherein the plurality of acoustic wave transducers comprise a plurality of piezoelectric transducers having different resonant frequencies, and the intensities of the plurality of piezoelectric transducers are separately controllable.

246. (New) The apparatus of claim 242 further comprising a through hole in the platter.

247. (New) The apparatus of claim 246 wherein the through hole is slightly offset from the center of the platter by a distance in the range of greater than zero and up to a few millimeters.

248. (New) The apparatus of claim 242 wherein the bracket is capable of rotation up to 6000 rpm relative to the platter.

249. (New) The apparatus of claim 242 further comprising a device for rotating the bracket relative to the platter.